

REMARKS

Applicant thanks Examiner for the earlier Examiner Interview. Applicant has requested the cancellation claims 1, 10 and 16 without prejudice. Further, Applicant has presented new claims 24, 25 and 26, and accordingly, request a new prior art search. Applicant has also submitted amendments to claims 2, 4-8, 11-13, 15, 17-23. In addition, Applicant submits that the new language in the new claims and in the amended claims do not include new matter.

§ 103(a) Rejections

Applicants respectfully submit that neither Herrera and Faroudja, whether considered alone or in combination, disclose, teach or suggest, either explicitly or implicitly, Applicants' claimed subject matter, and more specifically, fail to disclose, teach or suggest Applicants' claimed subject matter.

Herrera

Herrera is directed to a method and apparatus for processing DVD video. More specifically, Herrera discusses the modification of a 3D graphics accelerator to support MPEG-2 video decoding in a computer system for playing back a DVD data stream. (Abstract). Herrera further states that the modification of the 3D graphics accelerator allows for YUV 4:2:0 to YUV 4:2:2 conversion. (Id). In support of making such a modification to the 3D graphics processor, Herrera specifically notes the similarity between the YUV 4:2:0-to-4:2:2 conversion process and certain 3D texture mapping processes typically supported by most 3D engines. (col. 10, lns. 20-27). Herrera does not disclose, teach or suggest, whether considered alone, or in view of Faroudja, Applicants' method for de-interlacing interlaced video using a graphics processor.

Faroudja

Faroudja is directed to universal video disc record and playback employing motion signals for high quality playback of non-file sources. More specifically, Faroudja includes is directed to "a universal DVD ..., in which all moving picture sources, including motion picture film sources, interlaced television sources, and progressively-scanned television sources, are recorded as one or more coded bit streams representing progressively-scanned video having a nominal frame rate of 24 Hz to match substantially the world-wide standard motion picture film frame rate (24 fps)," (col. 3, lns. 19-24). Faroudja appears absent any discussion of the use of 2-D or 3-D engines. Faroudja does not disclose, teach or suggest, whether considered alone, or in view of Herrera, Applicants' method for de-interlacing interlaced video using a graphics processor.

Independent Claim 24

Applicants note Examiner's statement that Herrera does not disclose that a 2-D/3-D engine is used for adaptively de-interlacing a frame image from at least a first interlaced field. (Office Action, ¶ 2, pg. 2).

Further, Applicants submit that not only does Herrera does not disclose that a 2-D/3-D engine is used for adaptively de-interlacing a frame image from at least a first interlaced field, Herrera, but Herrera also does not disclose, Applicants' claimed subject matter including:

"receiving at least one instruction for a 2-D/3-D engine to facilitate creation of an adaptively de-interlaced frame image from at least a first interlaced field; and

performing, by the 2-D/3-D engine, at least a portion of adaptive de-interlacing based on at least the only a first interlaced field in response to the at least one instruction to produce at least a portion of the adaptively de-interlaced frame image;

wherein the first interlaced field is alternating lines of the interlaced video"

(Claim 24).

Regarding "de-interlacing," typically, images to be displayed on interlaced display devices, such as NTSC and PAL television displays, are displayed in successive screen refreshes where a first refresh displays the odd scan lines of information, and a second refresh is used to display the even lines of information. As known in the art, each group of alternating lines of a frame, either odd or even, are each known as an "interlaced field." Further, the process of using only one interlaced field, i.e., a group of either odd or even lines, to generate the full image is known in the art as "adaptive de-interlacing."

The need to perform adaptive de-interlacing arises when transforming interlaced video information, intended to be displayed on interlaced display devices, into de-interlaced video information, intended for display on progressive display devices. Progressive display devices refresh every display line each time the screen is refreshed. Therefore, in a conversion from interlaced video to de-interlaced video, the progressive display device's need for information about each line of display image, coupled with the delayed transmission of the even and odd lines from the corresponding interlaced video information, requires that a single group of even or odd lines, an interlaced field, be used to generate the corresponding interlaced field.

It should be noted that the adaptive de-interlacing technique used to generate the missing interlaced field from the known first interlaced field generates a result, i.e., the second interlaced field, which can be displayed together with the first interlaced field as a full image on the display device. However, since such interlaced display devices can only refresh the screen in even and odd sweeps, and since the actual missing interlaced field information will arrive before the next sweep will occur, there is generally no need to generate a second interlaced field via de-interlacing as the actual second interlaced field will arrive when needed.

Unlike the transformation of interlaced video information into a full de-interlaced video image, transformation of digital signals between YUV 4:2:0 to YUV 4:2:2 (together YUV information) does not involve the use of interlaced fields. Each group of YUV information contains display information corresponding to each display line of a progressive display device. The conversion simply transforms what represents full image information for one display format into another full image information for a second display format. Here, the transformation of a first set of video information of an originating format into a second set of video information of a second format, is unlike de-interlacing, for at least the reason that the second set of video information generated is incapable of being displayed in the originating format.

Therefore, any reference that describes the transformation between different types of YUV information, does not disclose, teach or suggest Applicants adaptive de-interlacing techniques. Therefore, any reference that describes such transformation of YUV information within a 2-D/3-D engine, also does not disclose, teach or suggest Applicants claimed subject matter.

Applicants therefore submit that neither Herrera's discussion of "a 3D graphics engine within modified graphics accelerator 84 performs the motion compensation, YUV 4:2:0-to-4:2:2 conversion ...," (col. 10, lns. 44-49), nor its discussion of "a planar YUV 4:2:0 to interleaved 4:2:2 conversion," (col. 2, lns. 54-59), discloses, teaches or suggests Applicants' claimed subject matter.

Applicants note that in order for prior art references to be combined by obviousness, at a minimum, there must be a suggestion of desirability for the modification. Neither *Herrera* or *Faroudja*. suggest a desirability for modification, explicit or otherwise. Additionally, since none of the cited references teach or suggest the use of a 2-D/3D engine to facilitate creation of an

adaptively de-interlaced frame image from at least a first interlaced field, the combination of any of the cited references cannot produce the Applicants' invention as claimed.

Regarding, Faroudja, Applicants submit that it fails to disclose

“receiving at least one instruction for a 2-D/3-D engine to facilitate creation of an adaptively de-interlaced frame image from at least a first interlaced field; and

performing, by the 2-D/3-D engine, at least a portion of adaptive de-interlacing based on at least the only a first interlaced field in response to the at least one instruction to produce at least a portion of the adaptively de-interlaced frame image;

wherein the first interlaced field is alternating lines of the interlaced video”

(Claim 24).

Applicants direct the Examiner's attention to the language in Faroudja that states:

“A conventional 625-line, 50 Hz 2/1 interlaced PAL video source is applied to a conventional standards converter 16. The standards converter [where] ... only interlaced-to-progressive scan conversion is applied, converting the signal from a 625-line 2/1 interlaced nominal 50 Hz (field rate) video signal to a 625-line progressively-scanned nominal 25 Hz (frame rate) video signal.”

(col. 7, lns. 31-38).

Applicants submit that such standard conversion uses both even and odd interlaced fields to generate the converted signal and is absent any disclosure, teaching or suggestion on how a single interlaced field could be transformed into a second corresponding interlaced field. In addition, because Faroudja is generally directed to the storage of video information on a DVD, Faroudja teaches away from Applicants' claimed subject matter, as it would be counterintuitive to generate a second corresponding interlaced field from a first interlaced field, when the actual second interlaced field is or will be available, and there is no time demand that requires the need for the second interlaced field before both the first and second interlaced field can be written to the DVD.

Further, Faroudja is absent any discussion of the use of a 2D/3D engine to perform any graphics processing. Rather Faroudja discloses the use of a basic encoder (Fig. 1) that does not appear to disclose a 2D/3D engine. As such, Applicants submit that Faroudja does not disclose, teach or suggest, whether considered alone, or in view of Herrera, Applicants' method for de-interlacing interlaced video using a 2-D/3-D engine.

Dependent Claim 2

Applicants respectfully reassert the arguments made above regarding claim 24. Further, Applicants submit that because claim 2 depends from claim 24, and as a dependent claim therefrom, claim 2 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 2 is also allowable in light of the presence of novel and non-obvious elements contained in claim 2 that are not otherwise present in claim 24.

Dependent Claim 3

Applicants respectfully reassert the arguments made above regarding claims 24 and 2. Further, Applicants submit that because claim 3 depends from claim 2, and as a dependent claim therefrom, claim 3 is allowable for at least the reasons claim 2 is allowable. Applicants further submit, argued in part at least immediate above, that claim 3 is also allowable in light of the presence of novel and non-obvious elements contained in claim 3 that are not otherwise present in claim 2.

Dependent Claim 4

Applicants respectfully reassert the arguments made above regarding claim 24. Further, because neither Herrera or Faroudja disclose, teach or suggest, whether considered alone or in combination, Applicants' claimed subject matter including, inter alia, "performing, by the 2-D/3-

D engine, at least a portion of adaptive de-interlacing,” (claim 24), neither Herrera or Faroudja, alone or in combination, can or do disclose, teach or suggest, Applicants’ claim 3 subject matter of “wherein the step of performing adaptive de-interlacing by the 2-D/3-D engine includes executing 2D/3D instructions that result in performing media filtering.”

Further, in response to the Office Action’s argument that median filtering is known to those of ordinary skill in the art, and therefore it would have been obvious to incorporate the median filter into Herrera’s system to achieve Applicants’ claimed subject matter, Applicants submit that the fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish prim facie obviousness. (MPEP 2143.01, pg. 2100-124). Nor can the level of skill in the art be relied upon to provide the suggestion to combine references. (Id). Further, Applicants further submit, that even if such median filtering was incorporated into Herrera’s disclosed system, one would still not be in possession of Applicants’ claimed subject matter (see arguments above regarding how Applicants’ claim 24 subject matter is not disclosed, taught or suggested by the cited art).

Further, Applicants submit that because claim 4 depends from claim 24, and as a dependent claim therefrom, claim 4 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 4 is also allowable in light of the presence of novel and non-obvious elements contained in claim 4 that are not otherwise present in claim 24.

Dependent Claim 5

Applicants respectfully reassert the arguments made above regarding claims 24 and 4. Further, Applicants submit that because claim 5 depends from claim 24, and as a dependent claim therefrom, claim 5 is allowable for at least the reasons claim 24 is allowable. Applicants

further submit, argued in part at least immediate above, that claim 5 is also allowable in light of the presence of novel and non-obvious elements contained in claim 5 that are not otherwise present in claim 24.

Dependent Claim 6

Applicants respectfully reassert the arguments made above regarding claim 24. As discussed above regarding claims 24, 4 and 5, neither Herrera or Faroudja disclose, teach or suggest, Applicants' "performing, by the 2-D/3-D engine, at least a portion of adaptive de-interlacing." Therefore, such cited art also does not disclose, teach or suggest "controlling the 2-D/3-D engine to perform the adaptive de-interlacing prior to display by the display engine." (Claim 6). Further, the language of Herrera cited by the Office Action identifies only the conversion between YUV 4:2:0 to YUV 4:2:2, and does not make any reference to Applicants' de-interlacing technique. Again Applicants' submit that neither Herrera alone, or Herrera in view of Faroudja, does not disclose, teach or suggest Applicants' claimed subject matter.

Further, Applicants submit that because claim 6 depends from claim 24, and as a dependent claim therefrom, claim 6 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 6 is also allowable in light of the presence of novel and non-obvious elements contained in claim 6 that are not otherwise present in claim 24.

Dependent Claim 7

Applicants respectfully reassert the arguments made above regarding claim 24. In addition, and as discussed above regarding claims 24, 4 and 5, neither Herrera or Faroudja disclose, teach or suggest Applicants' claimed subject matter, including, inter alia, "performing, by the 2-D/3-D engine, at least a portion of adaptive de-interlacing." Therefore, such cited art

also cannot, and does not disclose, teach or suggest “issuing 2D/3D instructions to the 2D/3D engine to carry out the de-interlacing of lines of video data from interlaced fields.” (Claim 7). Again, the language of Herrera cited by the Office Action identifies only the conversion between YUV 4:2:0 to YUV 4:2:2, and does not make any reference to Applicants’ de-interlacing techniques. Again Applicants’ submit that neither Herrera alone, or Herrera in view of Faroudja, does not disclose, teach or suggest Applicants’ claimed subject matter.

Further, Applicants submit that because claim 7 depends from claim 24, and as a dependent claim therefrom, claim 7 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 7 is also allowable in light of the presence of novel and non-obvious elements contained in claim 7 that are not otherwise present in claim 24.

Dependent Claim 8

Applicants respectfully reassert the arguments made above regarding claim 24. Further, the language of Herrera that the Office Action equates with Applicants claim 8, namely col. 10, lns. 44-49, discusses operations not instructions. More specifically, the cited language discusses motion compensation, YUV conversion, alpha blending, but does not disclose, teach or suggest “the at least one instruction includes at least one of a: line inverting instruction, a scaling instruction and a blend instruction.” (Claim 8). Further, as stated in claim 24, since the “at least one instruction” is to be executed by the “2D/3D engine” for the purpose of creating “an adaptively de-interlaced frame image from at least a first interlaced field,” (claim 24), and since, as described argued above regarding claim 24, Herrera does not discuss a 2D/3D engine that generates a de-interlaced frame image from an interlaced field, Applicants therefore submit that Herrera does not disclose, teach or suggest, whether considered alone, in or in combination with

Faroudja, a 2D/3D engine receiving instructions of claim 8 for the purpose of “facilitat[ing] creation of an adaptively de-interlaced frame image from at least a first interlaced field,” (claim 24).

Further, Applicants submit that because claim 8 depends from claim 24, and as a dependent claim therefrom, claim 8 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 8 is also allowable in light of the presence of novel and non-obvious elements contained in claim 8 that are not otherwise present in claim 24.

Dependent Claim 9

Applicants respectfully reassert the arguments made above regarding claim 24. Again, the Office Action cites language only from Herrera as the source of disclosure that would render Applicants’ claim 9 obvious in further light of Faroudja. However, neither Herrera alone, or Herrera in view of Faroudja, disclose, teach or suggest the operation of de-interlacing with respect to a 2D/3D engine, (see arguments regarding claim 24). Therefore, the “at least one instruction” intended “for a 2-D/3-D engine to facilitate creation of an adaptively de-interlaced frame image from at least a first interlaced field,” claim 24, is not disclosed by Herrera, or Herrera in view of Faroudja. As such, Applicants submit that Applicants claim 9 subject matter including “determining whether the at least one instruction is for the 2D/3D engine or for a display engine” is not disclosed, taught or suggested by either Herrera or Herrera in light of Faroudja.

Further, Applicants submit that because claim 9 depends from claim 24, and as a dependent claim therefrom, claim 9 is allowable for at least the reasons claim 24 is allowable. Applicants further submit, argued in part at least immediate above, that claim 9 is also allowable

in light of the presence of novel and non-obvious elements contained in claim 9 that are not otherwise present in claim 24.

Independent Claim 25

Regarding claim 25, Applicants respectfully reassert the arguments made above regarding claims 24, 3 and 9, and submit that independent claim 25 is allowable as written.

Dependent Claim 11

Applicants respectfully reassert the arguments made above regarding claim 2. Further, Applicants submit that because claim 11 depends from claim 25, and as a dependent claim therefrom, claim 11 is allowable for at least the reasons claim 25 is allowable. Applicants further submit, argued in part at least immediate above, that claim 11 is also allowable in light of the presence of novel and non-obvious elements contained in claim 11 that are not otherwise present in claim 25.

Dependent Claim 12

Applicants respectfully reassert the arguments made above regarding claim 5. Further, Applicants submit that because claim 12 depends from claim 25, and as a dependent claim therefrom, claim 12 is allowable for at least the reasons claim 25 is allowable. Applicants further submit, argued in part at least immediate above, that claim 12 is also allowable in light of the presence of novel and non-obvious elements contained in claim 12 that are not otherwise present in claim 25.

Dependent Claim 13

Applicants respectfully reassert the arguments made above regarding claim 13. Further, Applicants submit that because claim 13 depends from claim 25, and as a dependent claim therefrom, claim 13 is allowable for at least the reasons claim 25 is allowable. Applicants further

submit, argued in part at least immediate above, that claim 13 is also allowable in light of the presence of novel and non-obvious elements contained in claim 13 that are not otherwise present in claim 25.

Dependent Claim 14

Applicants respectfully reassert the arguments made above regarding claim 7. Further, Applicants submit that because claim 14 depends from claim 13, and as a dependent claim therefrom, claim 14 is allowable for at least the reasons claim 13 is allowable. Applicants further submit, argued in part at least immediate above, that claim 14 is also allowable in light of the presence of novel and non-obvious elements contained in claim 14 that are not otherwise present in claim 13.

Dependent Claim 15

Applicants respectfully reassert the arguments made above regarding claim 8. Further, Applicants submit that because claim 15 depends from claim 25, and as a dependent claim therefrom, claim 15 is allowable for at least the reasons claim 25 is allowable. Applicants further submit, argued in part at least immediate above, that claim 15 is also allowable in light of the presence of novel and non-obvious elements contained in claim 15 that are not otherwise present in claim 25.

Independent Claim 26 and dependent claims 17-19

Applicants respectfully reassert the arguments made above regarding claims 24, and 2-4. Further, Applicants submit that because claims 17-19 depend from claim 26, and as a dependent claims therefrom, claims 17-19 are allowable for at least the reasons claim 26 is allowable. Applicants further submit, argued in part at least immediate above, that claims 17-19 are also

allowable in light of the presence of novel and non-obvious elements contained in claims 17-19 that are not otherwise present in claim 26.


Dependent Claims 20-23

Applicants respectfully reassert the arguments made above regarding claims 6-9. Further, Applicants submit that because claims 20-23 depend from claim 26, and as a dependent claims therefrom, claims 20-23 are allowable for at least the reasons claim 26 is allowable. Applicants further submit, argued in part at least immediate above, that claims 20-23 are also allowable in light of the presence of novel and non-obvious elements contained in claims 20-23 that are not otherwise present in claim 26.

CONCLUSION

For the foregoing reasons, withdrawal of the rejections and allowance of the claims is respectfully requested. If there are any questions or comments regarding this response, the Examiner is encouraged to contact the undersigned at 312-609-7500.

Respectfully submitted,

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Dated: July 8, 2003

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